Columbia River Salmon and Steelhead Endorsement Recreational Anglers Board
Application for Funding

Applicant: Washington Department of Fish and Wildlife (WDFW)

Contact: Cindy Le Fleur (360-906-6708); Bryce Glaser (360-906-6765)

Proposal Title:
Rotating steelhead creel surveys for Lower Columbia River watersheds - **renewal**

Type of Proposal: Monitoring: summer and winter steelhead creel census to provide data for hatchery harvest analysis and wild steelhead interception rates.

Date of Submission: January 4, 2016

Effective Period of Funding: Field work will occur year-round. Because this is the third year of surveying on the current suite of rivers (3-year rotation), this year's project request has been extended to a 14.5 month period from **April 15, 2016 to June 30, 2017** to allow for creel of the entire winter/spring fishery period (runs through June 2, 2017) and alignment with transition to the next suite of rivers (Table 1). Analysis/Report writing will occur in April-June 2017.

Amount of Funding Requested: $365,025 (direct dollars)

Activities to be funded:

- Coweeman and Kalama Winter Steelhead Creel & Kalama Summer Steelhead Creel
- East Fork Lewis Summer and Winter Steelhead Creel
- Rock Creek (Stevenson) and Wind River Winter Steelhead Creel;
  Upper Wind River Catch and Release Summer Steelhead Creel;
  White Salmon Summer Steelhead Creel &
  Hooking Mortality on Wind River Summer Steelhead (limited continuation)
- Drano Lake Summer Steelhead Fishery Sampling
- Salmon Creek Catch Record Card data assessment

Background: Fishing opportunities in Washington State have become increasingly limited to provide additional protection to stocks listed under the Endangered Species Act (ESA). The Washington Fish and Wildlife Commission has adopted a policy (Policy C3619 Hatchery and Fishery Reform) that provides guidance to the Washington Department of Fish and Wildlife (WDFW) on managing hatcheries and harvest that is consistent with recovery of salmon and steelhead.

WDFW manages multiple steelhead fisheries in Lower Columbia River (LCR) tributaries. Many of these fisheries occur in areas where wild steelhead populations are listed as threatened under the ESA. The majority of these fisheries are centered around providing opportunity to harvest hatchery steelhead, but some also offer specific catch and release opportunity of wild steelhead. Currently, all wild steelhead caught in these fisheries must be released. Monitoring impacts of these fisheries on wild stocks is a critical component of fishery management and a requirement of conducting fisheries under the ESA, as described in WDFW's LCR Fisheries Management and Evaluation Plan (FMEP) and Hatchery and Genetic Management Plans (HGMP).

Until recently, WDFW has used limited creel data in conjunction with Catch Record Card (CRC) estimates and estimates of hooking mortality from the literature to evaluate LCR tributary fishery impacts to wild steelhead populations. In order to develop better estimates of harvest and wild steelhead interception rates, WDFW began implementing tributary creel surveys in 2011, funded through the Columbia River Salmon and Steelhead Endorsement (CRSSE) fee program. Prior to implementation of the Rotating Steelhead Creels in 2014, WDFW had completed three years (seasons) of steelhead creel surveys on the South Fork Toutle River (both summer and winter timeframes) and on the Washougal River for the selective gear and winter fishery. Additionally, WDFW had completed two years of creel on the Klickitat River to profile both salmon and steelhead fisheries there and one year of creel on the White Salmon River to evaluate angler effort after Condit Dam removal.

In 2014, WDFW developed a plan for continued implementation of LCR tributary steelhead creel surveys on a three year rotating basis (Table 1). To maximize efficiency and staff resources, the proposed schedule combined similar fisheries in adjacent basins into a single creel schedule where possible. Funding through CRSSE allowed continued implementation of the rotating creel design in 2014 and 2015. Currently, creel surveys are on-going on the EF Lewis, Kalama, Coweeman, and Wind rivers and Rock Creek. Creels were conducted last summer (2015) on the Washougal and White Salmon rivers. These surveys will continue to provide WDFW with fishery specific estimates of angler effort, harvest and wild fish interception rates needed to calculate wild fish impacts and better manage these fisheries into the future.

Table 1. WDFW LCR Tributary Steelhead Creel Surveys - 3-year Rotating Schedule

Basin	Fishery	Timeframe	2011	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Grays River	Winter	Nov 1 - March 15								17/18	18/19	19/20
Elochoman River	Winter	Nov 1 - March 15								17/18	18/19	19/20
Elochoman River	Summer	1st Sat June- Oct 31								2017	2018	2019
Mill/Abernathy/Germany	Winter	Nov 1 - March 15								17/18	18/19	19/20
Green River	Summer	Last Sat May- Nov 30								17/18	18/19	19/20
Salmon Creek	Winter	Nov 1 - March 15							16/17[1]	17/18	18/19	19/20
SF Toutle River	Summer	Last Sat May- Oct 31	2011	2012	2013							
SF Toutle River	Winter C/R	Nov 1 - March 15 or 31*		11/12	12/13	13/14						
Coweeman River	Winter	Nov 1 - March 15					14/15	15/16	16/17			
Kalama River	Winter	Nov 1 - June 15					14/15	15/16	16/17			
Kalama River	Summer	May 1 - Oct 31				2014	2015	2016				
EF Lewis River	Winter	Nov 1 - March 15					14/15	15/16	16/17			
EF Lewis River	Select Gear	April 16- Fri > 1st Sat June				2014	2015	2016				
EF Lewis River	Summer	1st Sat June- Oct 31				2014	2015	2016				
Washougal River	Summer	1st Sat June- Oct 31			2013	2014	2015					
Washougal River	Winter	Nov 1 - March 15		11/12	12/13	13/14						
Washougal River	Select Gear	April 16- Fri > 1st Sat June	2011	2012	2013							
Rock Creek/Wind River	Winter	Nov 1 - March 15					14/15	15/16	16/17			
Wind River	Summer C/I	Sept 15 - Nov 30					14/15	15/16	16/17			
White Salmon River	Summer	1st Sat June- Oct 31		2012		2014	2015	2016				
White Salmon River	Winter	Nov 1 - March 15										
Klickitat River	Summer	1st Sat June- Nov 30	2011		2013							

*SF Toutle closure date switched from March 31st to March 15th in spring 2013.

[1] Limited to analysis of CRC data for Salmon Creek in 2016/17.

In addition to steelhead creel surveys, CRSSE funding has also been used to implement a summer steelhead hooking mortality study on the Wind River. Scientifically reliable estimates of hook and release mortality are needed to ensure WDFW is adequately protecting wild stocks when providing sport fishing opportunity. The *U.S. v Oregon* Technical Advisory Committee is in the process of reviewing literature on hook and release mortality estimates and considering studies that have occurred in other systems for possible use in Columbia River fisheries; however, the literature review suggests that there can be a lot of variability within a river system and by species and it is crucial to have a study in the area of concern.

The Wind River study has been on-going for five years, including 2015, and utilizes a Control-Impact study design where the impact group consists of the adult steelhead caught with sport gear and tagged with passive integrated transponder (PIT) tags, while the control group consists of adults PIT tagged at Shipherd Fall's fish ladder trap. WDFW is testing two hypotheses: 1) there is no difference in the survival of steelhead caught with sport gear compared to steelhead tagged in the Wind River adult trap, and if sample sizes allow, 2) there is no difference in the survival of angler caught steelhead based on anatomical hook location. PIT tag detectors at Bonneville Dam will record PIT tagged kelts and repeat spawners enabling us to compare the survival of angled and control fish.

Preliminary data analysis from the first three years of the study has generated an estimate of hooking mortality. To continue to improve estimates and their level of uncertainty (confidence interval), we proposed in 2014 to continue marking fish for the study with a reduced level of angling effort by incorporating this work into the duties of staff also conducting the White Salmon, Wind River and Rock Creek Creels. This has proved to be an efficient use of staff time with an additional 75 and 55 fish caught and tagged in 2014 and 2015 for the study, respectively.

Proposed Activity: (Continuation of 2014/15 implementation)

- **Coweeman and Kalama Winter Steelhead Creel & Kalama Summer Steelhead Creel**

  From April, 2016 through early June 2017, creel surveys will be conducted on the Kalama River during the summer and winter steelhead fisheries and on the Coweeman River during the winter steelhead fishery (November 2016 through March 15, 2017). Technicians will conduct angler effort counts, query anglers about length of time fished, gear type, numbers of hatchery fish kept and wild fish released, and hooking location of steelhead caught and released by gear type used. Harvested fish will be sampled for biological data. A Fish and Wildlife Biologist 3 (FB3) will oversee field work implementation, data entry, data proofing/summary and assist with budget tracking. A Natural Resource Scientist (NRS) 4 (cost share) and a Research Scientist (RS) 1 will oversee the project, scheduling, track budgets, analyze data and write a final report summarizing total angler effort, catch rates, interception rates of wild steelhead, and total catch of fish kept and released.

- **East Fork Lewis Summer and Winter Steelhead Creel**

  Creel surveys will be conducted on the East Fork (EF) Lewis river during the summer steelhead fishery (April-October 2016) and the winter steelhead fishery (November 2016-March 2017). Technicians will conduct angler effort counts, query anglers about length of time fished, gear type, numbers of hatchery fish kept and wild fish released, and hooking location of steelhead caught and released by gear type used. Harvested fish will be sampled for biological data. A Fish and Wildlife Biologist 3 (FB3) will oversee field work implementation, data entry, data proofing/summary and assist with budget tracking. A Natural Resource Scientist (NRS) 4 (cost share) and a Research Scientist (RS)1 will oversee the project, scheduling, track budgets, analyze data and write a final report summarizing total angler effort, catch rates, interception rates of wild steelhead, and total catch of fish kept and released.

  The EF Lewis River was designated as a steelhead gene bank in 2014. Creels to date have provided baseline information on hatchery/wild composition during this fishery with hatchery fish (from in-basin releases) still present in the system through 2015/2016 (last year of 3-salt return from 2013 release). Creels in 2016/17 will occur with fewer hatchery fish available (3-salt summer-runs, repeat spawners or strays). In addition to the information gathered in the creel surveys noted above, WDFW will begin to monitor changes in the fishery as it moves to primarily catch and release of wild fish. The WDFW Lewis, Washougal Salmon Creek steelhead stakeholder work group recommending gene bank designation also strongly endorsed monitoring the effects of the new designation.

- **Rock Creek (Stevenson) and Wind River Winter Steelhead Creel;**
  Upper Wind River Catch and Release Summer Steelhead Creel;
  White Salmon Summer Steelhead Creel &
  Hooking Mortality on Wind River Summer Steelhead (limited continuation)

  In 2012, the WDFW Columbia Gorge steelhead stakeholder work group recommended creating a Rock Creek fishery (new fishery) to offset loss of steelhead harvest opportunity from the termination of hatchery steelhead plants into the White Salmon River and from recommending the Wind River be formally designated as a steelhead gene bank, which occurred in 2014. The first release of hatchery winter steelhead into Rock Creek occurred in the spring of 2013 with a portion of the release marked with Coded Wire Tags (CWT). First returns occurred in the winter of 2014/15. As part of creating this fishery, the work group strongly recommended continued hatchery plants be contingent on monitoring catch in Rock Creek and potential steelhead strays into the Wind River. The workgroup also recommended better monitoring of the catch and release summer steelhead fishery in the Wind River above Shipherd Falls.

  A creel of the White Salmon River was conducted in 2012, the first summer after the removal of Condit Dam. WDFW proposes to continue a follow up creel, determining how fish and anglers have responded to the increased habitat made available by the removal of Condit Dam.

  Lastly, WDFW proposes to continue the Wind River hooking mortality study, at a reduced level similar to 2014 and 2015, by continuing to opportunistically put out marks (PIT and Floy tags) on steelhead returning to Shipherd Falls and those angled in the Wind River as part of the study.

  From November 2016 through March 15, 2017, creel surveys will be conducted during the newly implemented Rock Creek fishery on both Rock Creek and the Wind River, and hatchery steelhead returns will be monitored/sampled at the Shipherd Falls adult trap (Wind River). Additionally, from September 16 to November 30, 2017, the Upper Wind River catch and release steelhead fishery will be creel surveyed. For the White Salmon River, creel surveys will be conducted from June thru October 2016. Angling for summer-steelhead in the Wind River as part of the continued hooking mortality study is proposed for ~8 hours/week from late June – November 2016.

  The above work proposed for Rock Creek, Wind River and the White Salmon River will not require a full-time (40 hour/week) position throughout the duration of the project time period. To maximize staffing efficiency and reduce costs, the proposed work will be completed by utilizing two part-time Scientific Technician

2s (ST2), who will already be on staff as part of WDFW's Wind River Watershed monitoring project funded by the Bonneville Power Administration (BPA).

For creel surveys, technicians will conduct angler effort counts, query anglers about length of time fished, gear type, numbers of hatchery fish kept and wild fish released, and hooking location of steelhead caught and released by gear type used. Harvested fish will be sampled for biological data, including CWTs. A Scientific Technician 4 (ST4) will oversee field work scheduling. An FB3 will assist with data entry, data proofing/summary and assist with budget tracking. A NRS 4 (cost share) and a RS 1 will oversee the project, track budgets, analyze data and write a final report for creel surveys summarizing total angler effort, catch rates, interception rates of wild steelhead, and total catch of fish kept and released. The hooking mortality data collected (new fish marked) will be funneled to the on-going database/analysis for that project.

- **Drano Lake Summer Steelhead Fishery Sampling**
  In conjunction with existing Drano Lake fishery sampling effort funded by BPA and the Idaho Department of Fish and Game (IDFG), WDFW will expand coverage in Drano Lake with the goal of getting better steelhead stock composition estimates for the fishery. From mid-July thru early September 2016, an ST2 will complete an additional three days of fishery sampling per week to bolster existing creel information and collect additional scale, CWT and DNA samples from steelhead caught in the fishery. Data collected will be funneled to WDFW's sport fishery sampling project staff for summary and analysis.

- **Salmon Creek Catch Record Card data assessment**

  Hatchery plants of winter steelhead were increased in Salmon Creek in the spring of 2013. This increase was recommended by the WDFW Lewis, Washougal, Salmon Creek steelhead stakeholder workgroup as a response to offset designation of the EF Lewis as a steelhead gene bank. The 2-salt returns from this increased plant began in the fall/winter of 2014/15. A full creel survey for Salmon Creek is proposed in the next rotation of this project to assess angler effort and estimate hatchery steelhead harvest and wild steelhead interception rates. In preparation for that creel, we propose to examine WDFW CRC data for Salmon Creek pre and post the hatchery plant increase to evaluate if an increase in harvest (and assumed angler participation) has occurred.

Effort/Assistance Required: As outlined above, effort for this work proposed for CRSSE funding will primarily be completed by Scientific Technician 2s, a Scientific Technician 4, a Fish and Wildlife Biologist 3 and a Research Scientist 1. A large portion of this request is devoted to vehicle and mileage costs, which cannot be eliminated for the creels to be successful.

Additionally, there is significant cost share provided for this project (Table 2) including: oversight/analysis support from Natural Resource Scientist 4 and Research Scientist 1 positions; implementation and supervisory support from a Fish and Wildlife Biologist 4; creel work for the project from WDFW and IDFG funds; and tagging of adult steelhead for the Hooking Mortality Study through operation of the Shipherd Falls adult fish trap, funded by BPA.

Table 2. Summary of Cost Share:

Position	**Activity**	**Time**	**Amount**
Natural Resource Scientist 4	Oversight/budget/report	1 month	$9,422
Fish & Wildlife Biologist 4	Oversight/supervision	0.5 months	$3,951
Research Scientist 1	Oversight/analysis –Hooking Mortality Study	0.5 months	$3,714
Scientific Technician 2s	Drano Creel sampling - IDFG	2.5 months	$20,000
Scientific Technician 2s	Shipherd Falls Trap operation/tagging for Hooking Mortality Study/office rent	Year-round	$44,220
TOTAL (includes indirect costs)			**$81,307**

Budget Summary

Salaries and benefits	
Research Scientist 1 (2.5 months @ $7,492/month)	$18,730
Fish Biologist 3 (1.5 months @ $7,716)	$11,574
Scientific Technician 4 (1 month @ $6,158/month)	$6,158
Scientific Technician 3 (1.5 months @ $5,644/month)	$8,466
Scientific Technician 2 (13.5 months @ $4,777/month EFL/Kal/Cow)	$64,487
Scientific Technician 2 (13.5 months @ $4,531/month EFL/Kal/Cow)	$61,167
Scientific Technician 2 (13.5 months @ $4,627/month EFL/Kal/Cow)	$62,468
Scientific Technician 2 (6 months @ $4,924/month – Rock/Wind/WS #1)	$29,543
Scientific Technician 2 (4 months @ $4,918/month – Rock/Wind/WS #2)	$19,675
Scientific Technician 2 (1.5 months @ $5,031/month - Drano)	$7,547
Scientific Technician 2 (4.5 months @ $4,934/month – Rover)	$22,203
Scientific Technician 2 (2.25 months @ $4,934/month – Rover)	$11,102
Personnel Service Charge	$1,529
Goods and Services	
Office/Field supplies	$1,000
Four Motor Pool Vehicle leases (Monthly charges + mileage)	$39,376
Sub Total	$365,025
Indirect (TBD%)	**$**TBD
Total Budget Amount	**$365,025**

Need for Proposed Activity: WDFW manages multiple steelhead fisheries in Lower Columbia River (LCR) tributaries. Many of these fisheries occur in areas where wild steelhead populations are listed as threatened under the ESA. The majority of these fisheries are centered around providing opportunity to harvest hatchery steelhead, but some also offer specific catch and release opportunity of wild fish. Currently, all wild steelhead caught in these fisheries must be released. Monitoring impacts of these fisheries on wild stocks is a critical component of fishery management and a requirement of conducting fisheries under the ESA, as described in WDFW's LCR Fisheries Management and Evaluation Plan (FMEP) and Hatchery and Genetic Management Plans (HGMP). Until recent implementation of creel surveys, river specific data on hatchery steelhead harvest and wild steelhead encounter rates has been limited.

WDFW needs to demonstrate to NOAA Fisheries that the agency is actively monitoring these fisheries and will be providing the scientific information needed to assess risk to wild steelhead stocks posed by the hatchery programs that are being implemented.

Providing accurate assessments of the impacts to wild fish handled in sport fisheries is essential to maintain existing hatchery production and to explore expansion of hatchery releases and/or increased fishing opportunities. The creel surveys will also provide more precise estimates of total harvest and allow a comparison with catch record card data. More exact measurements of harvest are needed to determine how programs are performing and how harvest can be increased. Catch record cards only provide information on harvest of hatchery fish; information on wild fish handled in sport fisheries is unavailable.

With increasing selective fisheries it is imperative that the reported fishing impacts on wild fish in FMEPs and HGMPs are accurate and within acceptable management levels in order to promote rebuilding of wild stocks and to maximize fishing opportunity**.** The FMEPs include annual reporting of fishery performance and impacts to wild stocks. The HGMPs submitted to NOAA Fisheries for Region 5's segregated steelhead programs include plans to use creel surveys to estimate fishery impacts to wild steelhead stocks and are necessary to continue hatchery releases at the current levels.

Wild steelhead gene banks were designated in 2014 on the NF Toutle/Green River, the EF Lewis River and the Wind River. WDFW has committed, through the steelhead management work group process, to monitor fishery participation and impacts in the new gene bank areas (EF Lewis and Wind rivers), and for the new winter steelhead fishery in Rock Creek (Stevenson, WA). Fishery creels will also provide information on stray hatchery-origin fish presence in gene bank areas, which will help guide future management decisions.

Benefit of Proposed Activity: Scientifically sound estimates of hatchery fish harvest and wild fish encounter rates for Lower Columbia River tributary steelhead fisheries would better inform fishery management decisions and help WDFW better meet its fishery monitoring obligations under the ESA, and ultimately provide the most opportunity for sport fishery harvest and hatchery fish production. Implementation of this project allows WDFW adherence to agreed to monitoring efforts associated with gene bank designations.

Public/Angler Benefit:

- Maintains WDFW's ability to provide LCR steelhead fisheries consistent with wild fish recovery and the ESA.
- A new steelhead fishery has been created in Rock Creek (Stevenson) to replace lost harvest opportunity in the Columbia River Gorge area.
- Economic Benefit: Three year average steelhead catch is listed below with accompanying economic value.

Catch of Steelhead by River and Estimated Economic Value*		
River	Catch	$Value
Coweeman	78	$45,200
Green	644	$373,700
Kalama	3,891	$2,257,000

S. F. Toutle	771	$447,400
Big White Salmon	4,123	$2,391,500
Little White & Drano (Summers only)	7,555	$4,382,100
Wind (Summers only)	642	$372,200
E. F. Lewis	861	$499,600
Salmon Creek	79	$45,800
Washougal	1667	$966,700

*Total Value = Catch Record Card totals, multiplied by 10 angler days/fish, multiplied by $58/angler day [1].

Benefit to Resource: Improved estimates of wild steelhead encounter rates during fisheries and better estimates of hooking mortality will improve management decisions/actions to protect and rebuild wild steelhead populations, while maintaining the ability to provide diverse and sustainable fishing opportunities.

Additional Considerations: This proposal outlines a cost-effective approach to gather needed creel information from LCR tributary steelhead fisheries on a 3-year rotating basis. The 3-year interval allows all major LCR tributary fisheries outside of the Cowlitz and Lewis fisheries, which are tied to hydropower mitigation programs, to be surveyed over the course of approximately nine years. It also provides the ability to capture inter-annual variability in angler effort, harvest and wild fish encounter rates as physical conditions (i.e. marine survival) and fishery structure (i.e. establishment of wild stock gene banks) change. The information gleaned from these surveys will complement WDFW's Policy C3619 (Hatchery and Fishery Reform), and provide needed information specific to FMEPs and HGMPs required to operate steelhead fisheries and hatcheries in Southwest Washington under the ESA.

[1]Economic Analysis of the Non-Treaty Commercial and Recreational Fisheries in Washington-December 2008 (Prepared for the WDFW Fish and Wildlife Commission)